



*Pre-Installation Manual*

**GS-Series Pinsetters**  
and Associated Brunswick Bowling Equipment

**Electrical Requirements**

May 2018 / 10-095400-041

**Brunswick**   
CUSTOMER SERVICE  
A tradition in excellence.

**Brunswick GS-Series Pinsetters and Associated Brunswick Bowling Equipment Electrical Requirements Pre-Installation Manual**

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**Reorder Part No. 10-095400-041**

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## SAFETY

Throughout this publication, “Warnings”, and “Cautions” (accompanied by one of the International HAZARD Symbols) are used to alert the mechanic to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. They are defined below. **OBSERVE AND READ THEM CAREFULLY!**

These “Safety Alerts” alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus training and “Common Sense” operation are major accident prevention measures.



*NOTE or IMPORTANT!:* Will designate significant informational notes.



**WARNING!**

***Will designate a mechanical or nonelectrical alert which could potentially cause personal injury or death.***



**WARNING!**

***Will designate electrical alerts which could potentially cause personal injury or death.***



**CAUTION!**

***Will designate an alert which could potentially cause product damage.***



***Will designate grounding alerts.***

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## **SAFETY REQUIREMENTS FOR GS-SERIES PINSETTERS**

As with all machinery, a certain amount of risk is involved in working on the GS-Series Pinsetter. However, if the necessary care, knowledge and responsibility are exercised, damage to the pinsetter and people involved in accidents can be avoided. The following steps should be taken:

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### **Safety Guidelines**

1. ONLY PROPERLY TRAINED PEOPLE ARE QUALIFIED TO WORK ON OR OPERATE THE PINSETTER
2. Never operate the pinsetter without ALL factory supplied guarding in place.
3. Never operate the pinsetter if a guard or safety device is damaged or improperly fitted to the machine.
4. Never bypass, disable, or tamper with the safety interlocks or pinsetter function switches.
5. Never attempt to climb over or around any mechanical barrier or machine guard.
6. Reinstall all the machine guards and the ladder after any troubleshooting or maintenance work has been done on the pinsetter(s) or ball accelerator.
7. Always face toward the machine when using the ladder to climb onto or off the machine. Only one person should be on the ladder at any time.
8. Suitable clothing must be worn (for example: rubber-soled shoes). Do not wear loose clothing such as neckties or smocks that could get caught in moving parts. Remove rings, watches, earrings, bracelets and other jewelry to avoid injury.
9. Care should be taken while near the front of the machine. Accidentally blocking the photocell beam will cause the pinsetter to cycle.
10. Always turn the Pinsetter off before working on the machine. Use the rear LCD Display mounted on the pin elevator or toggle the stop/run switch on the Nexgen box to the stop position.
11. If more than one person is working on a machine or if a stop/run switch will be out of reach while working on the machine, lockout Safety Controller power switch to prevent a person from turning on the pinsetter before the other person says he/she is clear of the pinsetter.
12. When working on both machines of a lane pair or components that are common to both machines (for example - an electronic control box or ball accelerator) power must be turned off at the Nexgen box and the input power cable must be locked out on the Safety Controller power switch.
13. The sweep boards for the lane pair must be dropped to the guarding position when working on the pinsetter or the ball accelerator to prevent a bowling ball from entering the pinsetter.
14. Prior to performing service work underneath the setting table, place a jack stand or other suitable support under the center of the table.

15. Fire extinguishers must be on hand and maintained properly. Keep oily rags and other combustibles in approved fire proof containers.
16. If more than one person is working on a machine, be sure the other person is CLEAR before restarting the machine.
17. When working in the pinsetter area while machines are in operation, ear protection should be worn. Sound levels greater than 83db can be experienced within 1.6 meters of operating machines.
18. Never remove the V-belt from the setting table motor without first lowering the table to the new pin setting position (pindeck).
19. Never work on or around the pinsetter while under the influence of alcohol, drugs, or any other substance that can impair your physical abilities or mental judgment.
20. Always use the correct tools for the job.
21. The GS-Series pinsetter is designed for use as a 10 pin bowling machine. Do not use the machine or any of its subassemblies for any other purpose.
22. Poisonous or toxic cleaners must not be used. Always check the material safety data sheets before using new cleaners.
23. Always use factory approved parts when repairing the pinsetter. Using substandard parts may pose a safety risk.
24. Always make sure that a bowler is not positioned to throw a ball before putting yourself between the bowler and the machine. It is good practices to have another employee positioned near any bowler to ensure they cannot throw a ball and/or place a sign on the approach to indicate the lane is not available for bowling.

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## CENTER MECHANIC

The GS-X Pinsetter Safety Controller system must be commissioned and serviced only by center mechanic.

Center Mechanics are defined as persons who

- have undergone the appropriate technical training **and**
- who have been instructed by the responsible pinsetter operator in the operation of the pinsetter and the current valid safety guidelines **and**
- who have access to the “Safety Photoelectric Switch System L 4000” operating instructions.

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## General Safety Information and Protective Measures

### Safety Notes

Please observe the following procedures in order to ensure the correct and safe use of the GS-X Pinsetter Power Controller system.

- The national/international rules and regulations apply to the installation, commissioning, use and periodic technical inspections of the GS-X Pinsetter Safety Controller system, in particular
  - Machine Directive 98/37/EEC
  - Equipment Usage Directive 89/655/EEC
  - the work safety regulations/safety rules
  - other relevant health and safety regulations
- Users of the pinsetter with which the GS-X Pinsetter Safety Controller system is used are responsible for obtaining and observing all applicable safety regulations and rules
- It is imperative that the test notes from 2.3 and 2.4 of these operating instructions (Tests before the first commissioning. Functional checks of the protective device.) are observed.
- The tests must be carried out by the center mechanic and must be recorded and documented to ensure that the tests can be reconstructed and retraced at any time.
- The operating instructions must be made available to the user of the pinsetters where GS-X Pinsetter Safety Controller system is used. The pinsetter operator is to be instructed in the use of the device by center mechanic and must be instructed to read the operating instructions.

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# *Introduction*

This document contains the information necessary for the preparation of a site conforming to Brunswick specifications. It is very important the site complies with the requirements specified in the following pages. Any deviations from these specifications could cause problems to your equipment that may be difficult to detect and/or correct.

This document is divided into three sections. Refer to the particular section needed for details about the equipment being installed.

- Introduction
- Electrical Specifications
- Power Outlet Information



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## INTERFERENCE INFORMATION



### **CAUTION!**

***This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the installation manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.***

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### **NEC 250-74 Exception No. 4**

Where required, for the reduction of electrical noise (electromagnetic interference) on the grounding circuit, a receptacle in which the grounding terminal is purposely insulated from the receptacle mounting means shall be permitted. The receptacle grounding terminal shall be grounded by an insulated equipment grounding conductor run with the circuit conductors.

The grounding conductor shall be permitted to pass through one or more panel boards without connection to the panel board grounding terminal as permitted by Section 384-27, Exception, so as to terminate directly at the applicable derived system or service grounding terminal.

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### **Surge Suppression**

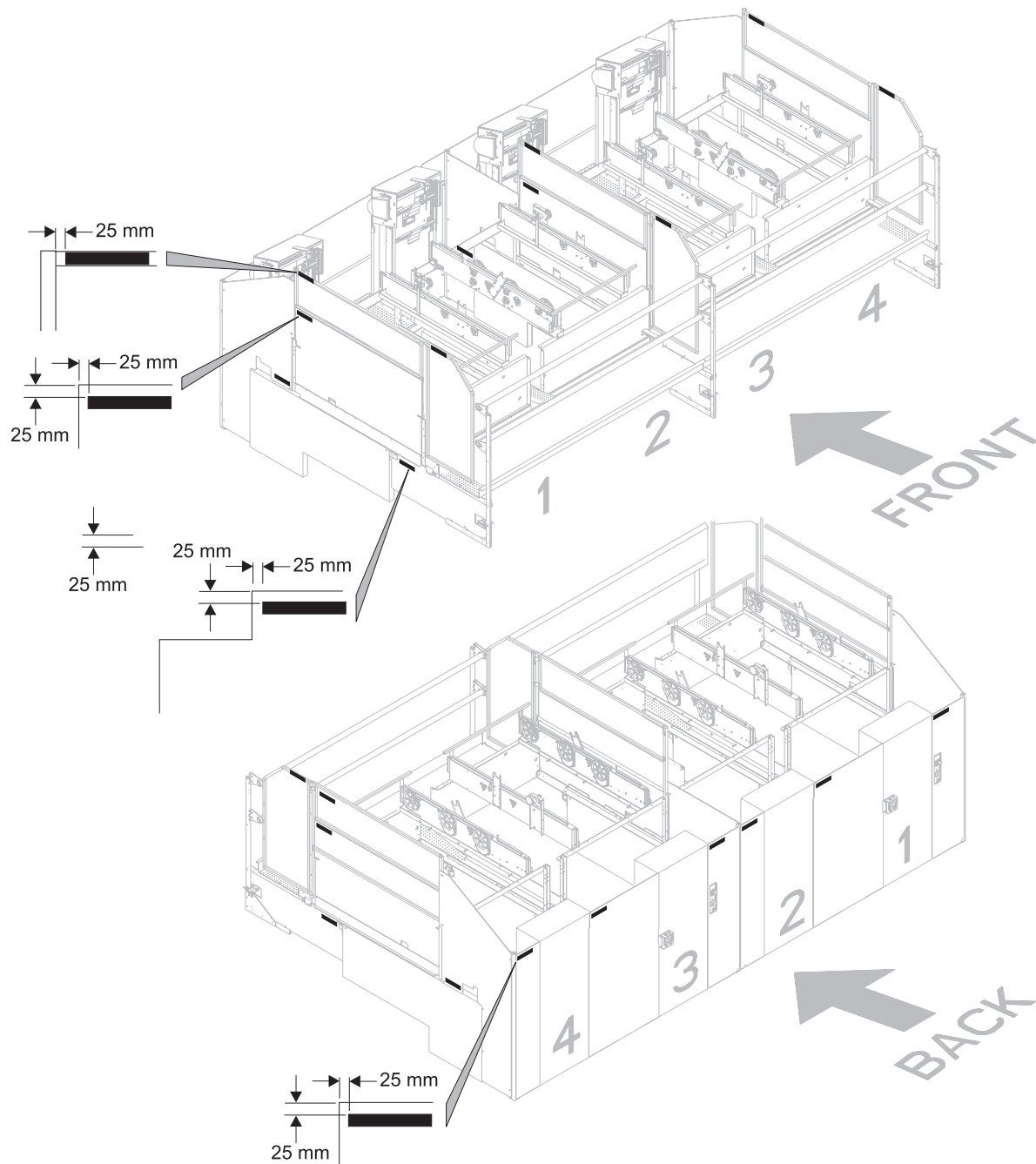
A Transient voltage suppressor (TVSS) is supplied with the pinsetter system. The installation of this device is the responsibility of the customer through a licensed electrician. The unit will be located at the pinsetter sub-panel that supplies the power to the pinsetters. This unit is designed for the most demanding environment and incorporates multistage filtration in its design. The Sine Wave tracking series is engineered to remove the more complex disturbances found in the electrical environment, in particular, high and low voltage ringing transients and harmonic activity.

**i** **NOTE:** *The surge suppressor wires should be as short as possible, with no coiling when installed on the pinsetter sub-panel. The TVSS device is provided with a plastic coupler to insulate the unit from the sub-panel.*

# SAFETY WARNING LABELS



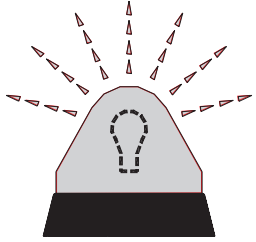
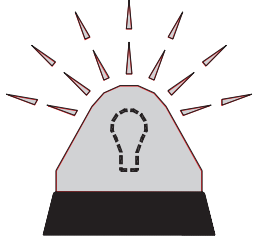
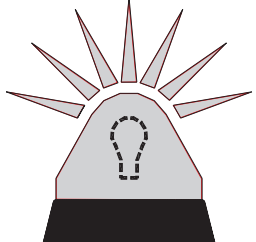

## Warning Label Location - 11-682565-000

 <b>WARNING</b>		Moving parts can crush and cut. Keep guards in place. Lock out power before servicing.
		Brunswick Label 11-682565-000















# ELEVATOR WARNING LABELS

## Elevator Guard Warning Label - 11-682498-000

 <b>WARNING</b> 	
<p>The Pinsetter uses a <b>RED</b> light to indicate the machine operating condition. To avoid injury see instructions below.</p>	
	<p>Rapid-flashing red light indicates the pinsetter is <b>GETTING READY TO RUN</b>. Stay clear of machine &amp; keep guards in place.</p>
	<p>Slow-flashing red light indicates an error has occurred. The pinsetter needs attention. Turn machine off and lock out power before servicing.</p>
	<p>Solid red light indicates the pinsetter is <b>READY TO RUN</b>. A signal from a remote location will cause the pinsetter to start <b>WITHOUT WARNING</b>. Stay clear of machine. Keep guards in place.</p>
	<p>No light indicates the pinsetter is off. Safe to Service. Lock out power before servicing.</p>

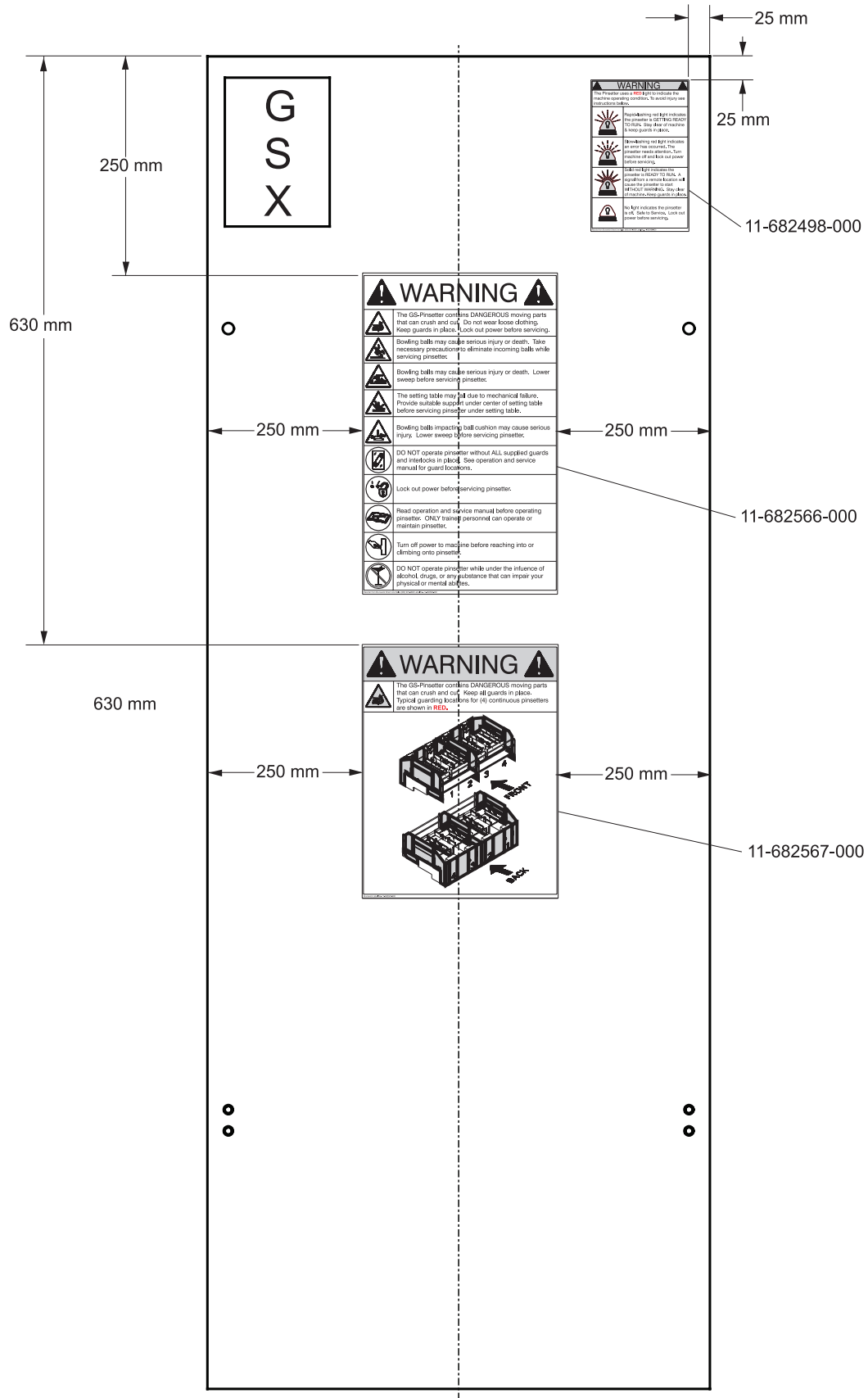
Reorder from Brunswick Direct Line Sales (800) 937-2695 Label No. 11-682498-000

## Elevator Guard Warning Label - 11-682566-000

 <h1 style="font-size: 2em; margin: 0;">WARNING</h1> 	
	<p>The GS-Pinsetter contains DANGEROUS moving parts that can crush and cut. Do not wear loose clothing. Keep guards in place. Lock out power before servicing.</p>
	<p>Bowling balls may cause serious injury or death. Take necessary precautions to eliminate incoming balls while servicing pinsetter.</p>
	<p>Bowling balls may cause serious injury or death. Lower sweep before servicing pinsetter.</p>
	<p>The setting table may fall due to mechanical failure. Provide suitable support under center of setting table before servicing pinsetter under setting table.</p>
	<p>Bowling balls impacting ball cushion may cause serious injury. Lower sweep before servicing pinsetter.</p>
	<p>DO NOT operate pinsetter without ALL supplied guards and interlocks in place. See operation and service manual for guard locations.</p>
	<p>Lock out power before servicing pinsetter.</p>
	<p>Read operation and service manual before operating pinsetter. ONLY trained personnel can operate or maintain pinsetter.</p>
	<p>Turn off power to machine before reaching into or climbing onto pinsetter.</p>
	<p>DO NOT operate pinsetter while under the influence of alcohol, drugs, or any substance that can impair your physical or mental abilities.</p>

Reorder from Brunswick Direct Line Sales (800) 937-2695 Label No. 11-682566-000

# Elevator Guard Warning Label - 11-682567-000



# Electrical Overview

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## ELECTRICAL SUBPANEL SPECIFICATIONS

**i IMPORTANT!:** *All subpanels and wiring MUST comply with local and national electrical codes.*

**Pinsetter Subpanel**– The Pinsetter subpanel used to power the GS-Series pinsetters and other Brunswick equipment must be powered directly from the primary main service subpanel or transformer and must be three phase. Non-Brunswick equipment including electronic video games, arc welders, HVAC, compressors, etc., cannot share this sub-panel.

**Scoring Subpanel (Isolated Ground)**– The scoring subpanel must be powered from the main service subpanel or transformer. This is an isolated ground subpanel that is REQUIRED for all of Brunswick electronic equipment and installed according to National Electric Code 250-74 or similar isolated ground guidelines according to local code and national electric codes. All the outlets for this panel must be an isolated receptacle similar to “Hubbell IG 5262” receptacles.

The **ONLY** type of equipment to be installed in the subpanels:

### **Pinsetter Subpanel**

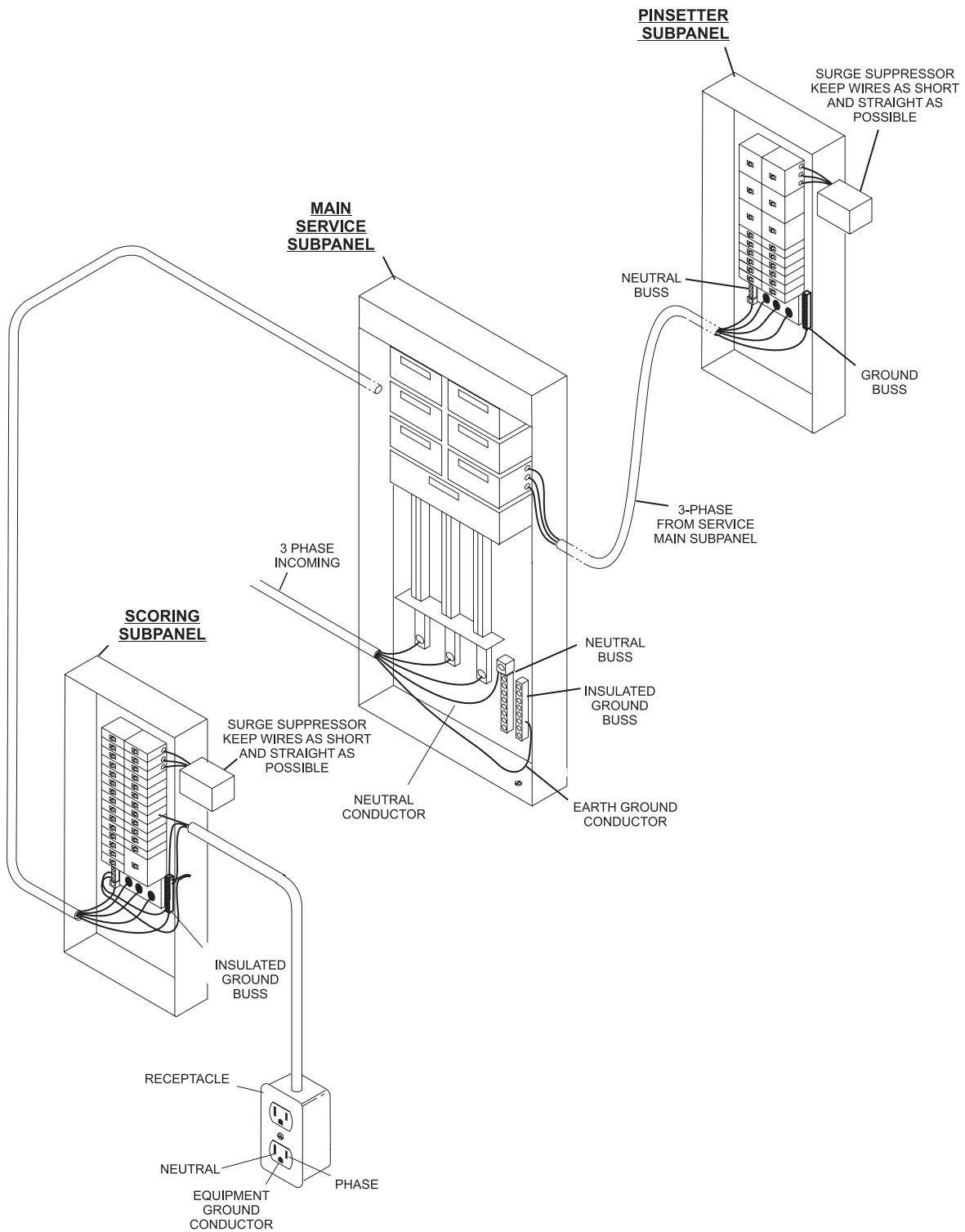
- GS-X Pinsetter
- Ball Lift
- Tel-E-Foul
- Lane Machine
- Ball Polisher
- Lightworx
- Lanescape Video Masking Unit

### **Scoring Subpanel (Isolated Ground)**

- Scoring Computer
- Overhead Monitors
- Display Controller
- HD Video Distribution Center
- Server Computer
- Client Computer
- Automated - Pinball Wizard



**WARNING!** *Any Non-Brunswick equipment circuits located in these subpanels will VOID ALL WARRANTY. This includes electronic video games, arc welders, HVAC, compressors, etc.*

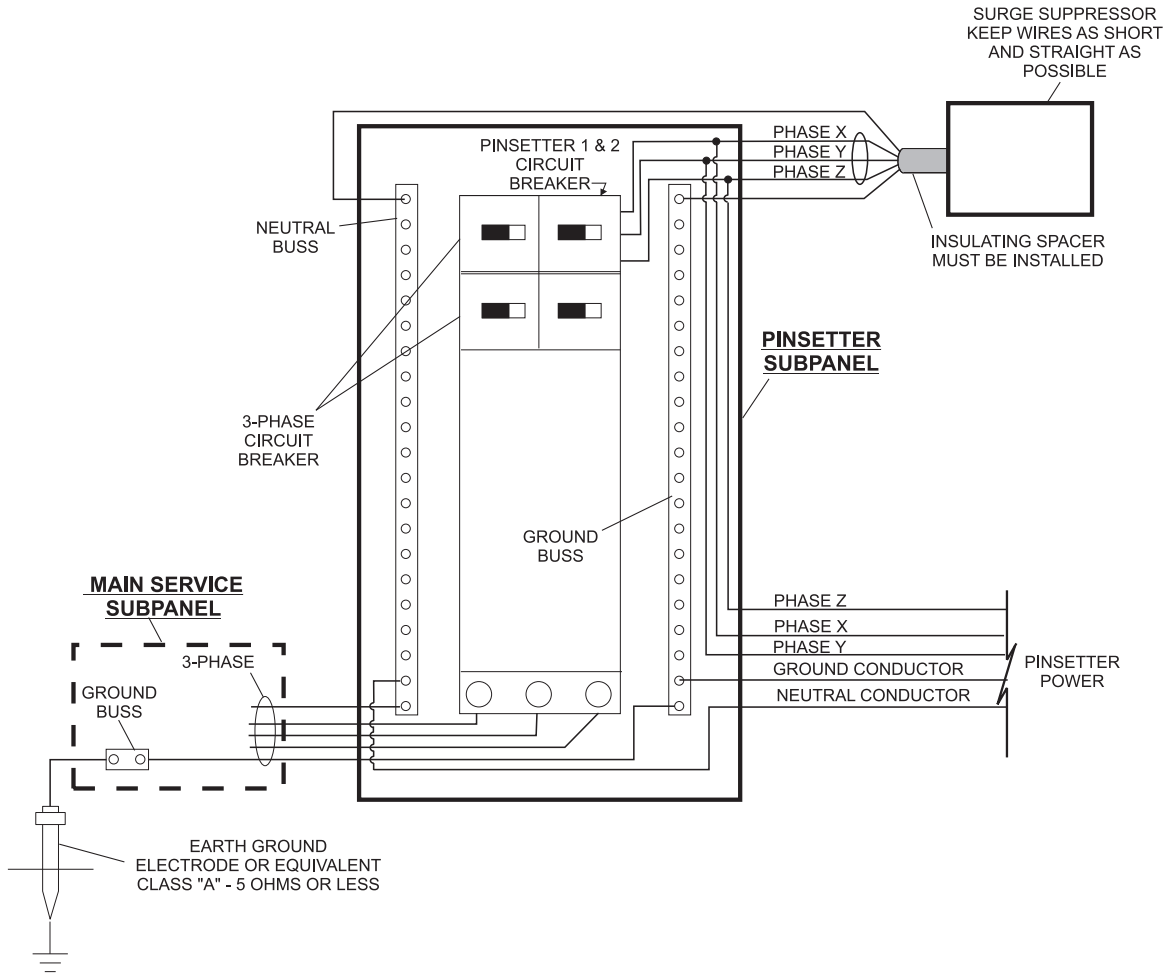


**i IMPORTANT!:** Split house centers with multiple subpanels require a single source of power and ground from main service.

# PINSETTER SUBPANEL AND SURGE SUPPRESSOR INSTALLATION



**CAUTION!** Each phase from the surge suppressor should be installed on each phase of power on the 3 phase circuit breaker, typically pinsetter 1 and 2 circuit breaker.

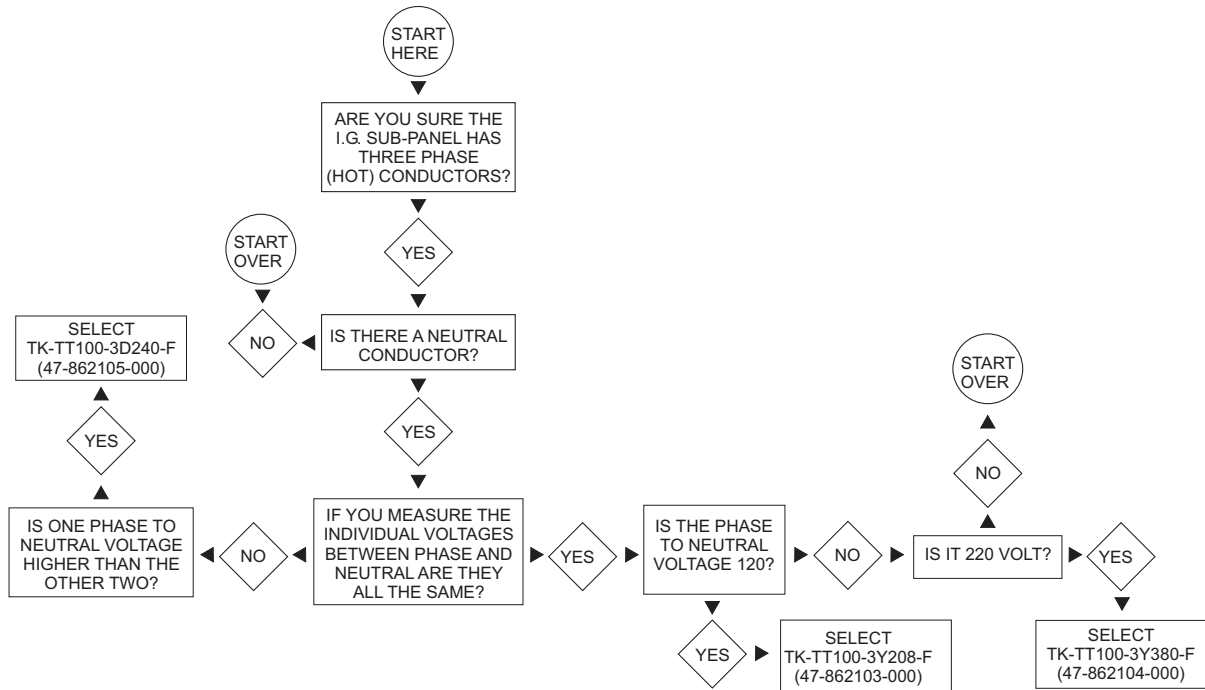




# SELECTING A SURGE SUPPRESSOR

A flow chart diagram is shown below to assist you in identifying which surge suppressor is needed.

Model	Voltage/Phase	Wye/Delta	No. of Wires	Brunswick Part No.
TK-TT100-3Y208-F	120/208 Three	Wye	4 Wire + Ground	47-862103-000
TK-TT100-3D240-F	120/240 Three	Delta	4 Wire + Ground	47-862105-000
TK-TT100-3Y380-F	220/380 Three	Wye	4 Wire + Ground	47-862104-000



# *Electrical Specifications*

---

## **IMPORTANT WIRING INSTRUCTIONS**

1. The GS-Series sub-panel used to power the GS-Series pinsetters or Brunswick equipment must be powered directly from the primary service panel or transformer and must be three phase.
2. No circuits to the GS-Series sub-panel can share a conduit with other non-Brunswick equipment.
3. Use correct AWG for sub-panel and associated branch circuits. If sub-panel to main service (feed) exceeds 150 feet (45.72 m), increase the AWG of wire accordingly.
4. Non-Brunswick equipment including electronic video games, arc welders, etc., cannot share this sub-panel.
5. If local code requires conduit, raceways, or other devices for wiring to, from, or between Brunswick equipment, the installation and material costs shall be the responsibility of the customer.
6. All wiring and sub-panels must be furnished and installed by the customer.
7. All power distribution and wiring **MUST** comply with local and national electrical codes.
8. Failure to comply with these instructions will void all warranties due to electrical noise or where power conditioning is needed.
9. Wiring of surge suppressor needs to be on the same circuit breaker as lanes 1 and 2.

# OPERATING VOLTAGES / POWER CONNECTIONS

## GS Nexgen (Without Safety Controller)

The motor on the GS-Series machine can be wired for either 208 phase to phase or 240 phase to phase, 380 phase to phase voltage.

Shown below are three configurations of input power to the GS-Series pinsetters that are NOT equipped with Safety Controllers; *Figure 1* is for a 120/240 volt (Delta) 3 phase system, *Figure 2* is for a 208 volt (Wye) 3 phase system, *Figure 3* is for a 220/380 volt (Wye) 3 phase system. and *Figure 4* is for a 220 volt (Phase Converter without a Safety Controller) 3 phase system,

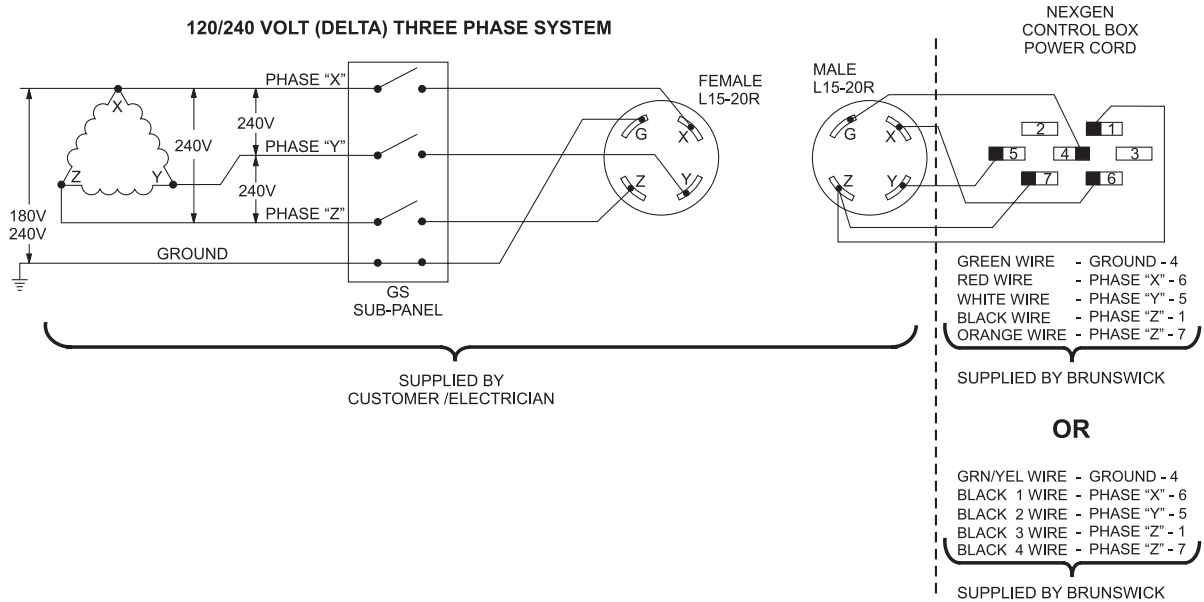


Figure 1

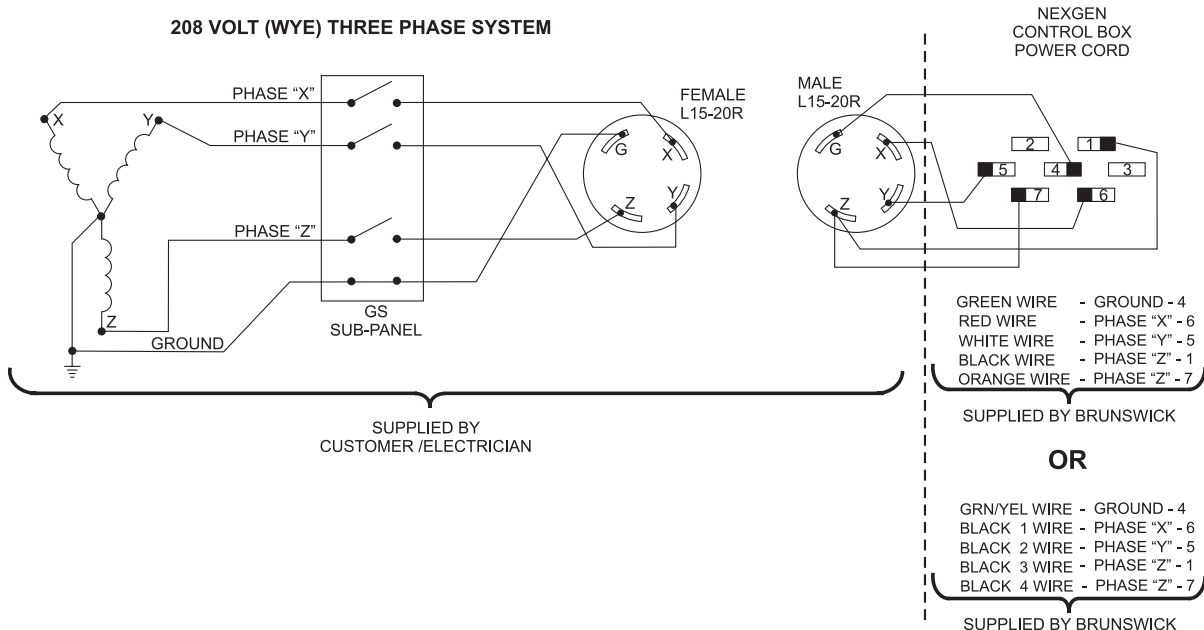


Figure 2

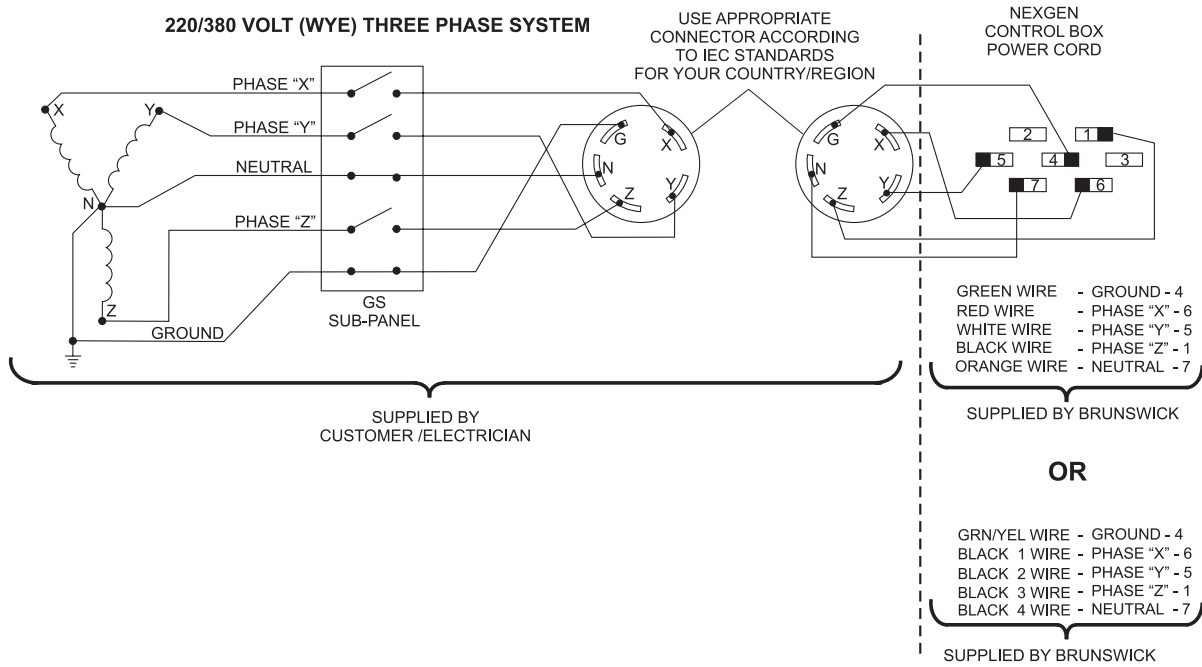


Figure 3

**220/240 VOLT (PHASE PERFECT CONVERTOR WITHOUT SAFETY CONTROLLER) THREE PHASE SYSTEM**

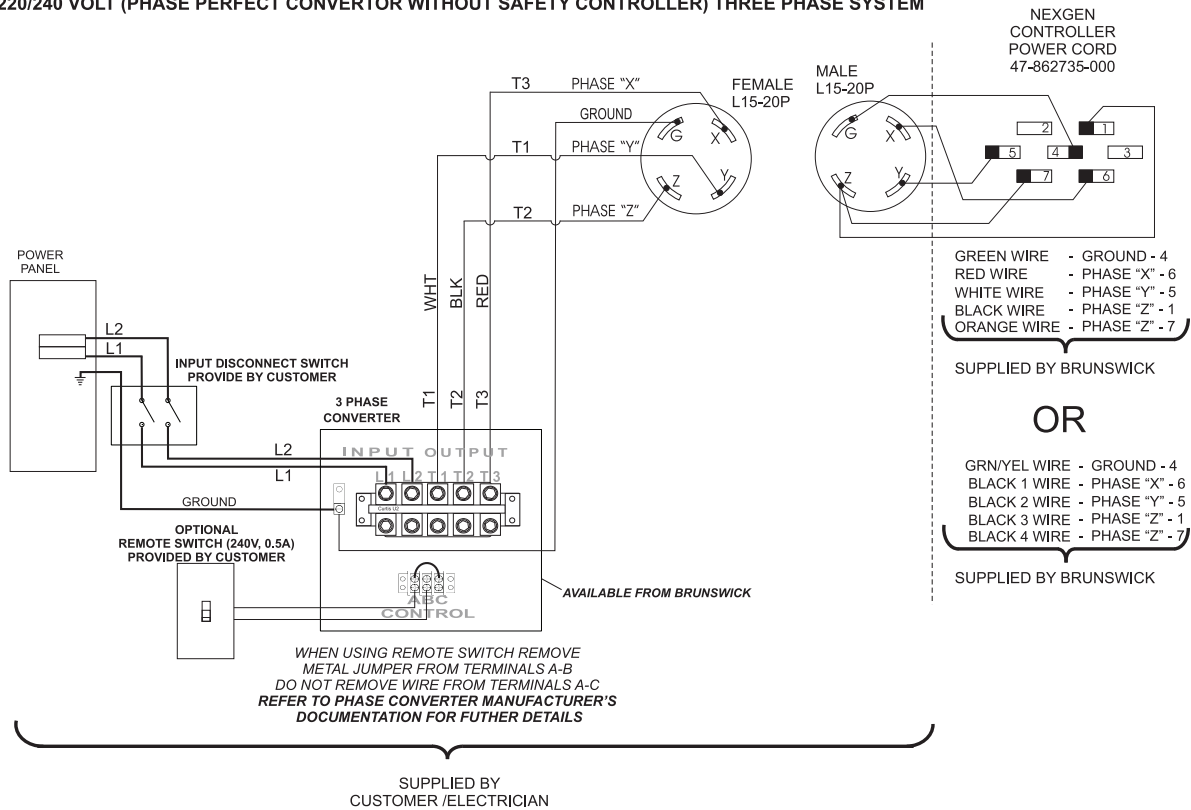
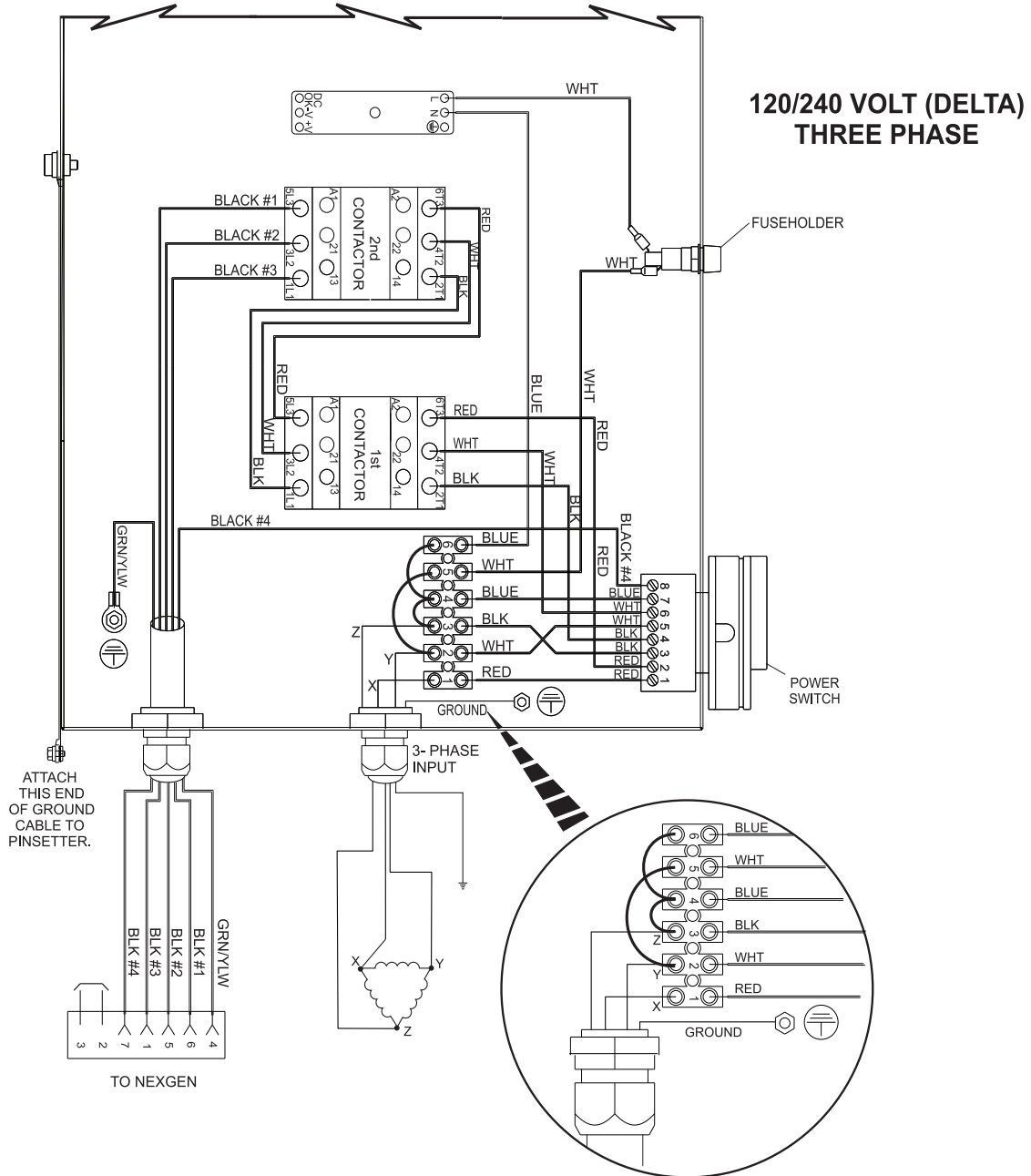


Figure 4

## GS Nexgen (With Safety Controller)

Shown below are three configurations of input power to the GS-Safety Controller; *Figure 5* is for a 120/240 volt (Delta) 3 phase system, *Figure 6* is for a 208 volt (Wye) 3 phase system, *Figure 7* is for a 220/380 volt (Wye) 3 phase system, *Figure 8* is for 220 volt single phase with phase converter (residential) and *Figure 9* is for 220 volt single with phase converter with a Buck/Boost transformer used to lower the voltage on the generated phase (residential).

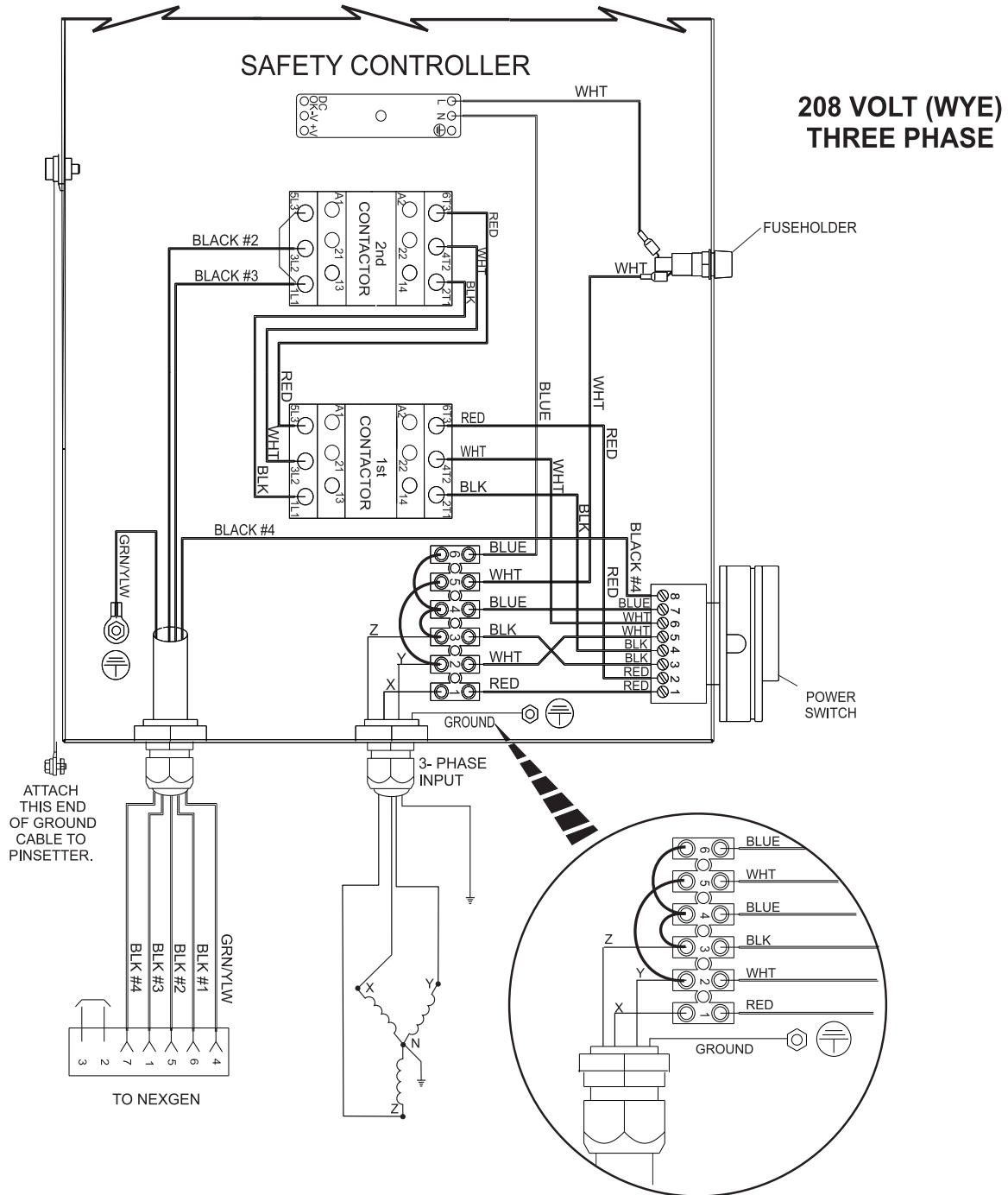


ELECTRICIAN TO HARD WIRE POWER CABLE INTO SAFETY CONTROLLER AND PINSETTER CONTROL BOX(ES) USING RIGID CONDUIT.

THE CONTROL BOX(ES) MUST BE CONNECTED TO A GROUNDED, METAL, PERMANENT WIRING SYSTEM; OR AN EQUIPMENT-GROUNDING CONDUCTOR MUST BE RUN WITH THE CIRCUIT CONDUCTORS AND CONNECTED TO THE EQUIPMENT-GROUNDING TERMINAL ON THE CONTROL BOX.

ALL ELECTRICAL CONNECTIONS MUST COMPLY WITH LOCAL CODE OF THE AREA IN WHICH THE PINSETTER IS BEING INSTALLED.

Figure 5

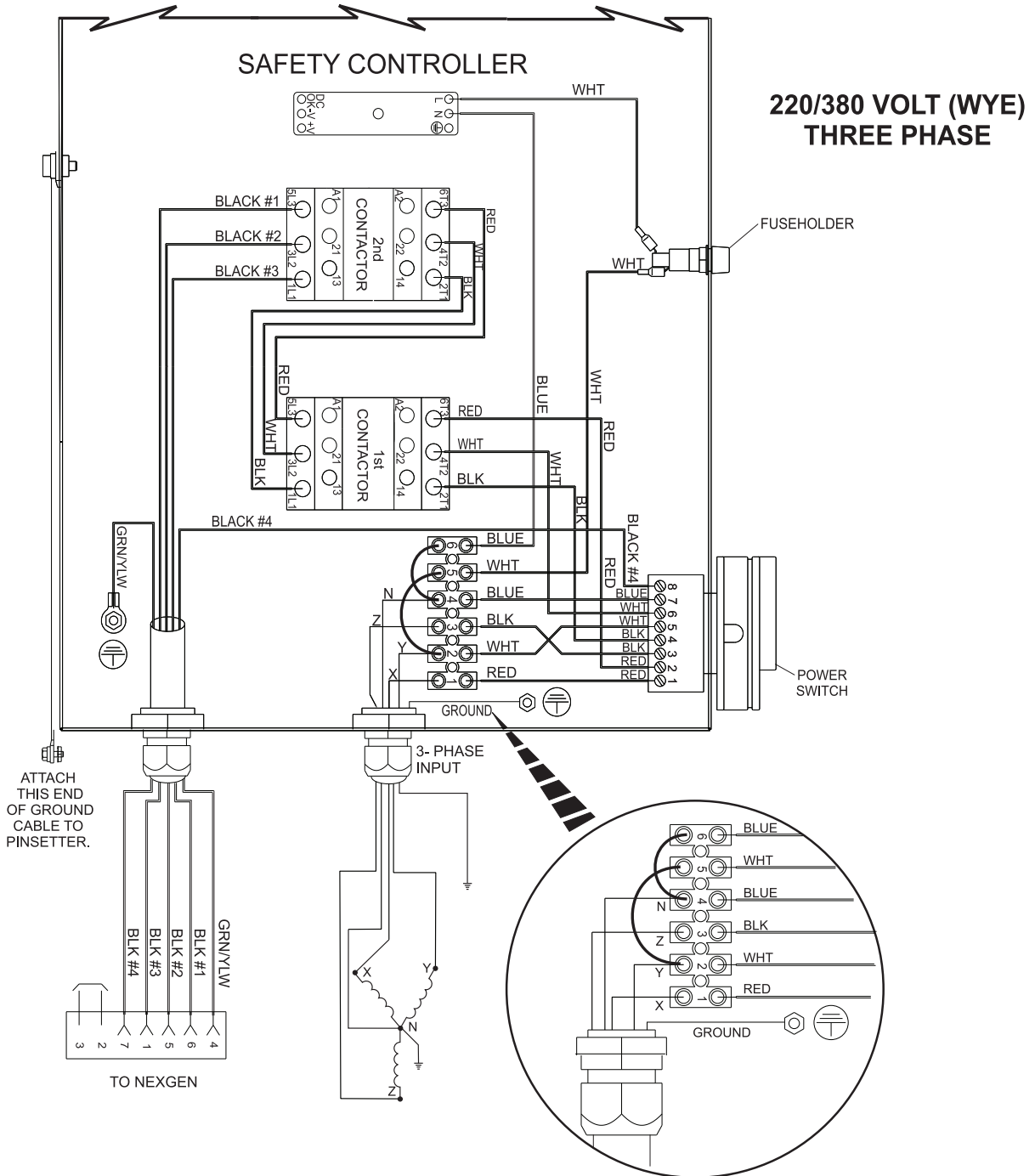


ELECTRICIAN TO HARD WIRE POWER CABLE INTO SAFETY CONTROLLER AND PINSETTER CONTROL BOX(ES) USING RIGID CONDUIT.

THE CONTROL BOX(ES) MUST BE CONNECTED TO A GROUNDED, METAL, PERMANENT WIRING SYSTEM; OR AN EQUIPMENT-GROUNDING CONDUCTOR MUST BE RUN WITH THE CIRCUIT CONDUCTORS AND CONNECTED TO THE EQUIPMENT-GROUNDING TERMINAL ON THE CONTROL BOX.

ALL ELECTRICAL CONNECTIONS MUST COMPLY WITH LOCAL CODE OF THE AREA IN WHICH THE PINSETTER IS BEING INSTALLED.

Figure 6



ELECTRICIAN TO HARD WIRE POWER CABLE INTO SAFETY CONTROLLER AND PINSETTER CONTROL BOX(ES) USING RIGID CONDUIT.

THE CONTROL BOX(ES) MUST BE CONNECTED TO A GROUNDED, METAL, PERMANENT WIRING SYSTEM; OR AN EQUIPMENT-GROUNDING CONDUCTOR MUST BE RUN WITH THE CIRCUIT CONDUCTORS AND CONNECTED TO THE EQUIPMENT-GROUNDING TERMINAL ON THE CONTROL BOX.

ALL ELECTRICAL CONNECTIONS MUST COMPLY WITH LOCAL CODE OF THE AREA IN WHICH THE PINSETTER IS BEING INSTALLED.

Figure 7

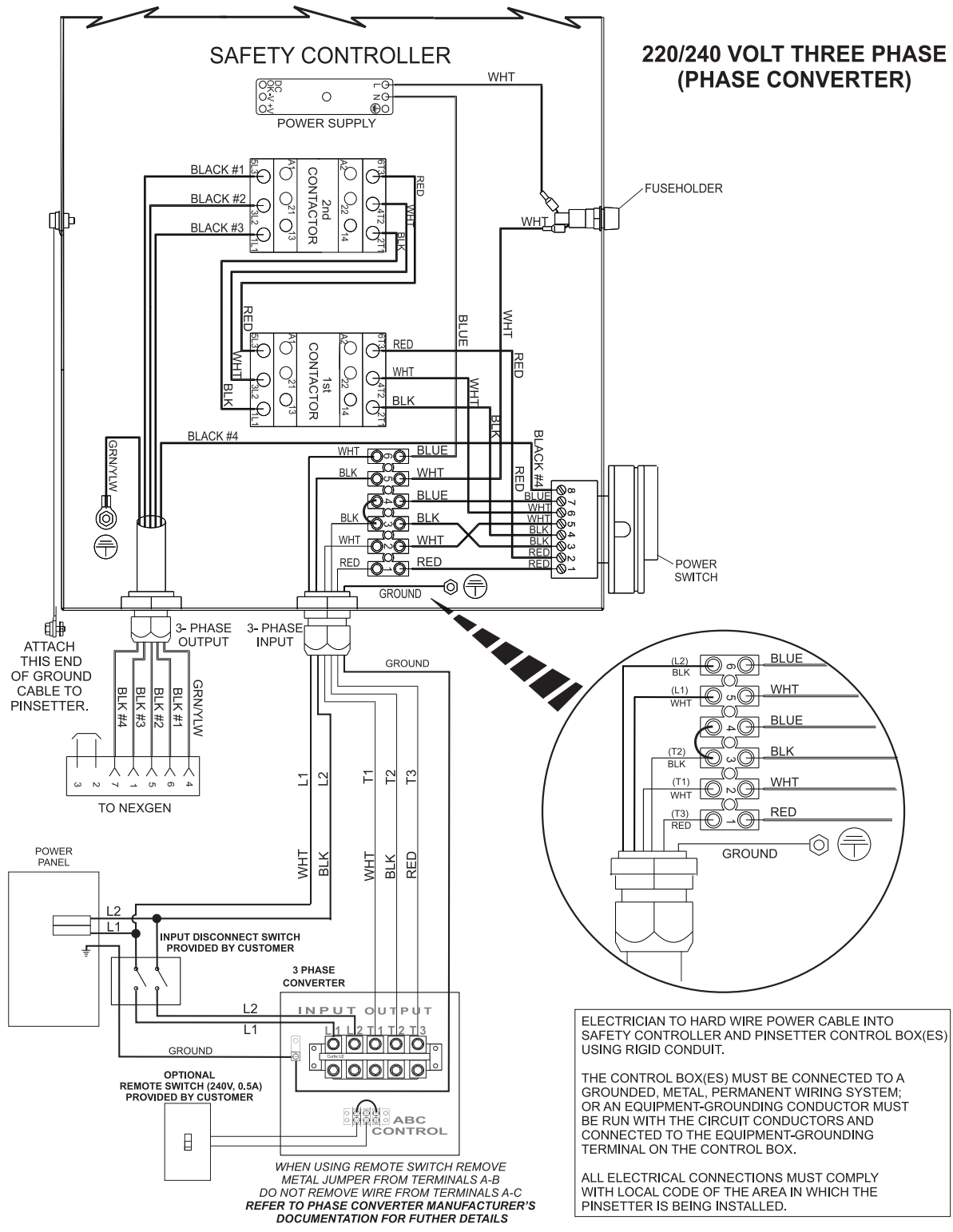


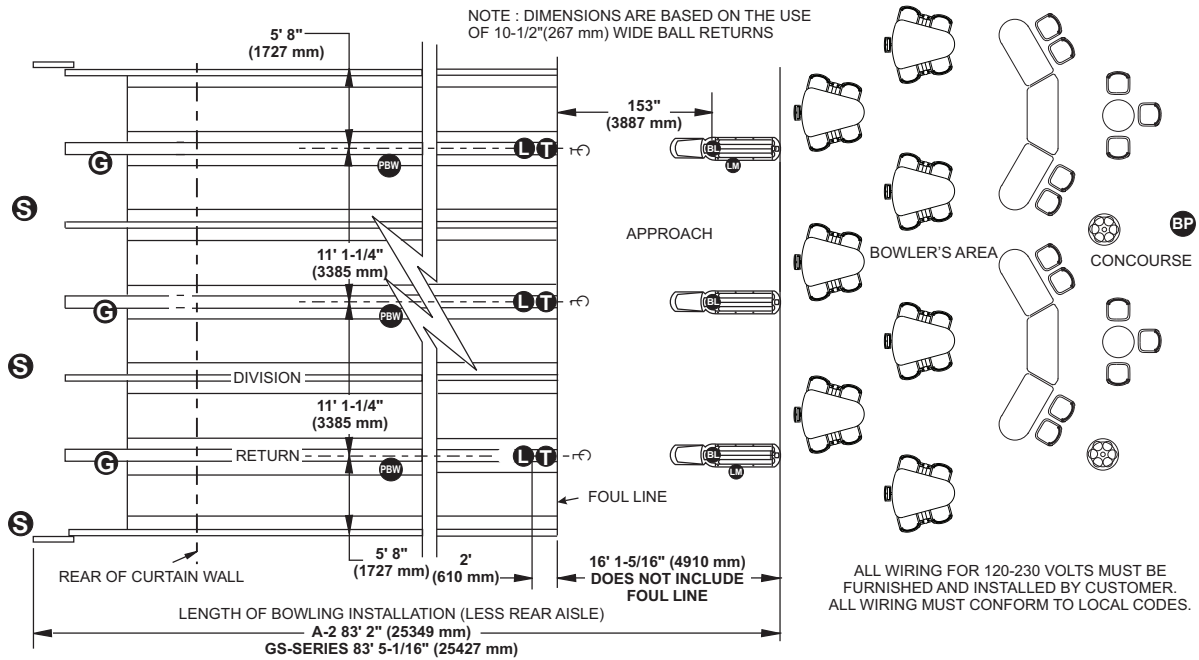
Figure 8



# Power Outlet Information

## SUMMARY OF ELECTRICAL INFORMATION

ITEM & SYMBOL	VOLTS	HERTZ	AC OR DC	H.P. MOTOR	MOTOR TYPE (CAPACITOR OR OTHER)	PHASE	OPERATING CURRENT (AMPS)	UNITS PER FUSED CIRCUIT	CIRCUIT BREAKER SIZE	WATTS	CONNECTORS		SPECIAL NOTES	GS-SUB PANEL
											MALE	FEMALE		
GS-Series Nexgen Controller Note: Per Pair of Pinsetters <b>G</b>	See Figures 1-3	50/60	AC	3 Total	Other	3	12	1 (Pair of Lanes)	15 A	—	—	Hubbell 2423	Type "S" Service Cord, Rubber Sheathed, 3 or 4 Wire, Plus Ground 12 Gauge	Yes
GS-Safety Controller Note: Per Pair of Pinsetters <b>S</b>	Refer to Figures 4-7	50/60	AC	3 Total	Other	3	12.5	1 (Pair of Lanes)	15 A	—	—	—	Type "S" Service Cord, Rubber Sheathed, 3 or 4 Wire, Plus Ground 12 Gauge	Yes
Ball Lift Control Box <b>BL</b>	120	50/60	AC	1/4	Cap	1	6	2	20A	—	—	—	3 Wire, Grounded	Yes
	230						4	3	16A					
Tel-E-Foul Unit (2 Lanes) <b>T</b>	120	50/60	AC	—	—	1	1	14	20A	—	—	—	3 Wire, Grounded	Yes
	230						0.5	20	16A					
Lane Machine <b>LM</b>	120	50/60	AC	2	2 Cap 2 Other	1	15	—	20A	—	—	—	Standard, 3 Prong Grounded Outlet	No
	230			1			10		16A					
Ball Polisher <b>BP</b>	208	50/60	AC	1	Cap	1	20 (30 Surge)	1	30A	—	—	—	3 Wire Grounded Outlet	No
	230						—		—					
Lightworx <b>L</b>	120	50/60	AC	—	—	1	1	14	20A	—	—	—	3 Wire, Grounded	Yes
	230						0.5	20	16A					
Pinball Wizard <b>PBW</b>	120	50/60	AC	1/10	Cap	1	3	5	20A	—	—	—	I.G. 5262 Hubble Receptacle or Equivalent	Yes
	230						2	6	16A					



# GS PINSETTER POWER OUTLET INFORMATION

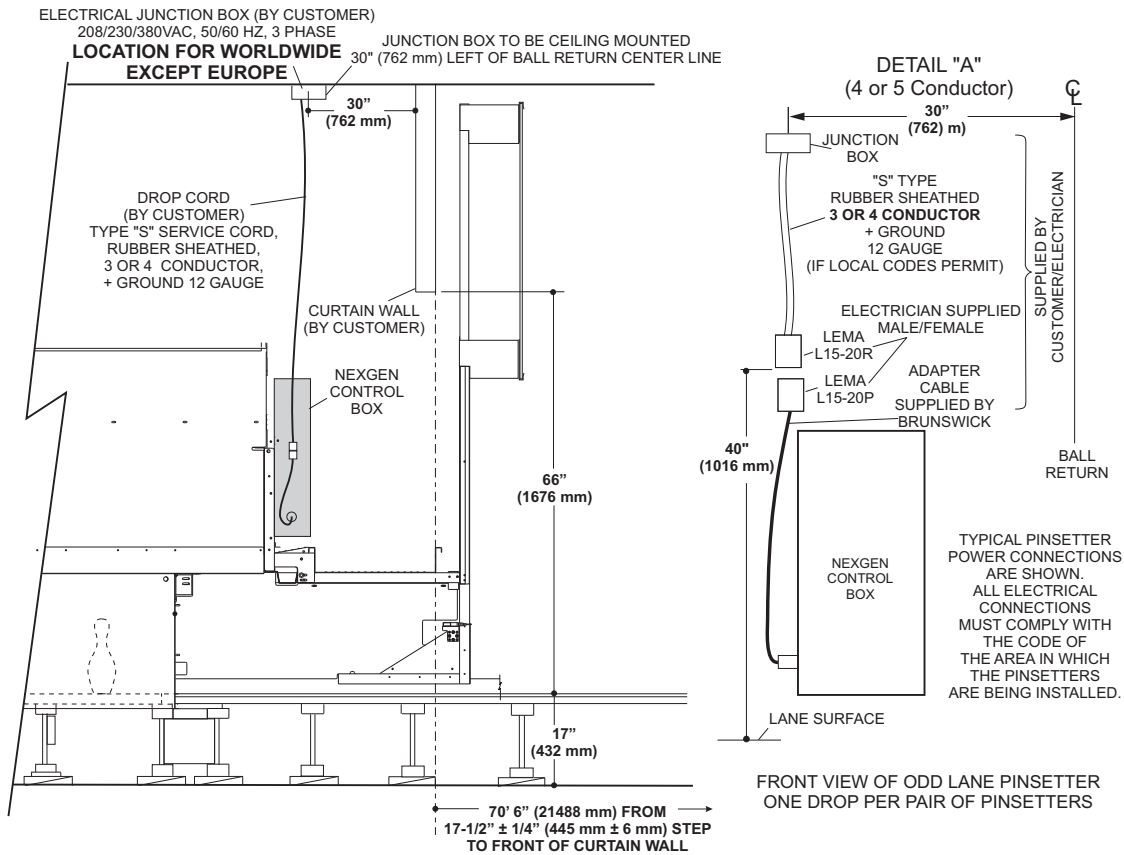
## Base Guarding without Safety Controller - Curtain Wall / Masking Unit

POWER REQUIREMENTS - GS SERIES NEXGEN CONTROLLER								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
REFER TO FIGURES 1-4	50/60	AC	3	12	-	3 OR 4 WIRE + INSULATED GROUND	TO SUPPLY FEEDER WIRING, "J" BOX, FLEXIBLE DROP CORD AND MATING PLUGS.	TO PROVIDE REQUIRED ADAPTER CABLE

CIRCUIT REQUIREMENTS - GS-SERIES NEXGEN CONTROLLER					
GS-SERIES SUBPANEL	WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
YES	3/4	1 PER LANE PAIR	12 GAUGE	15 A	YES

**OUTLET LOCATION - GS-SERIES NEXGEN CONTROLLER**  
 ONE JUNCTION BOX ABOVE THE BALL RETURN PER PAIR OF GS PINSETTERS

## WITH CURTAIN WALL / MASKING UNIT



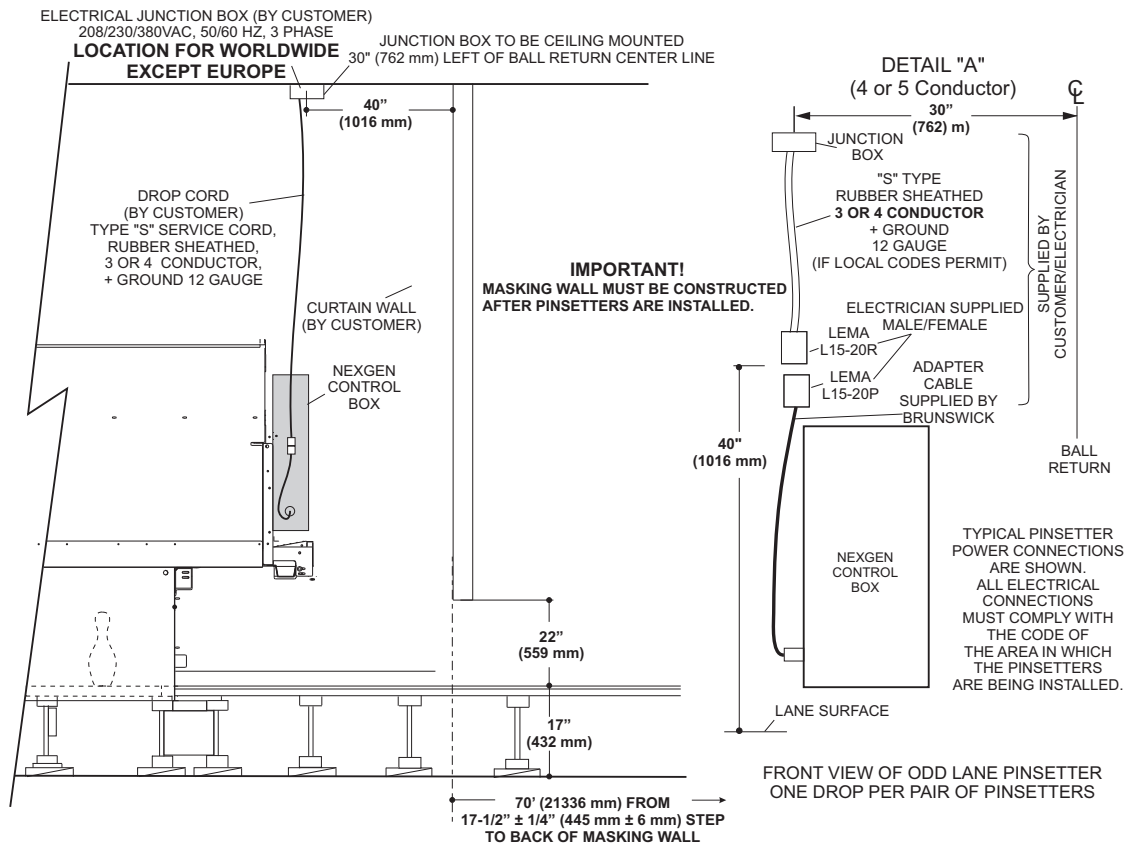
## Base Guarding without Safety Controller - Masking Wall

POWER REQUIREMENTS - GS SERIES NEXGEN CONTROLLER								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
REFER TO FIGURES 1-4	50/60	AC	3	12	-	3 OR 4 WIRE + INSULATED GROUND	TO SUPPLY FEEDER WIRING, "J" BOX, FLEXIBLE DROP CORD AND MATING PLUGS.	TO PROVIDE REQUIRED ADAPTER CABLE

CIRCUIT REQUIREMENTS - GS-SERIES NEXGEN CONTROLLER					
GS-SERIES SUBPANEL	WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
YES	3/4	1 PER LANE PAIR	12 GAUGE	15 A	YES

OUTLET LOCATION - GS-SERIES NEXGEN CONTROLLER
ONE JUNCTION BOX ABOVE THE BALL RETURN PER PAIR OF GS PINSETTERS

## WITH MASKING WALL



# SAFETY CONTROLLER POWER OUTLET INFORMATION

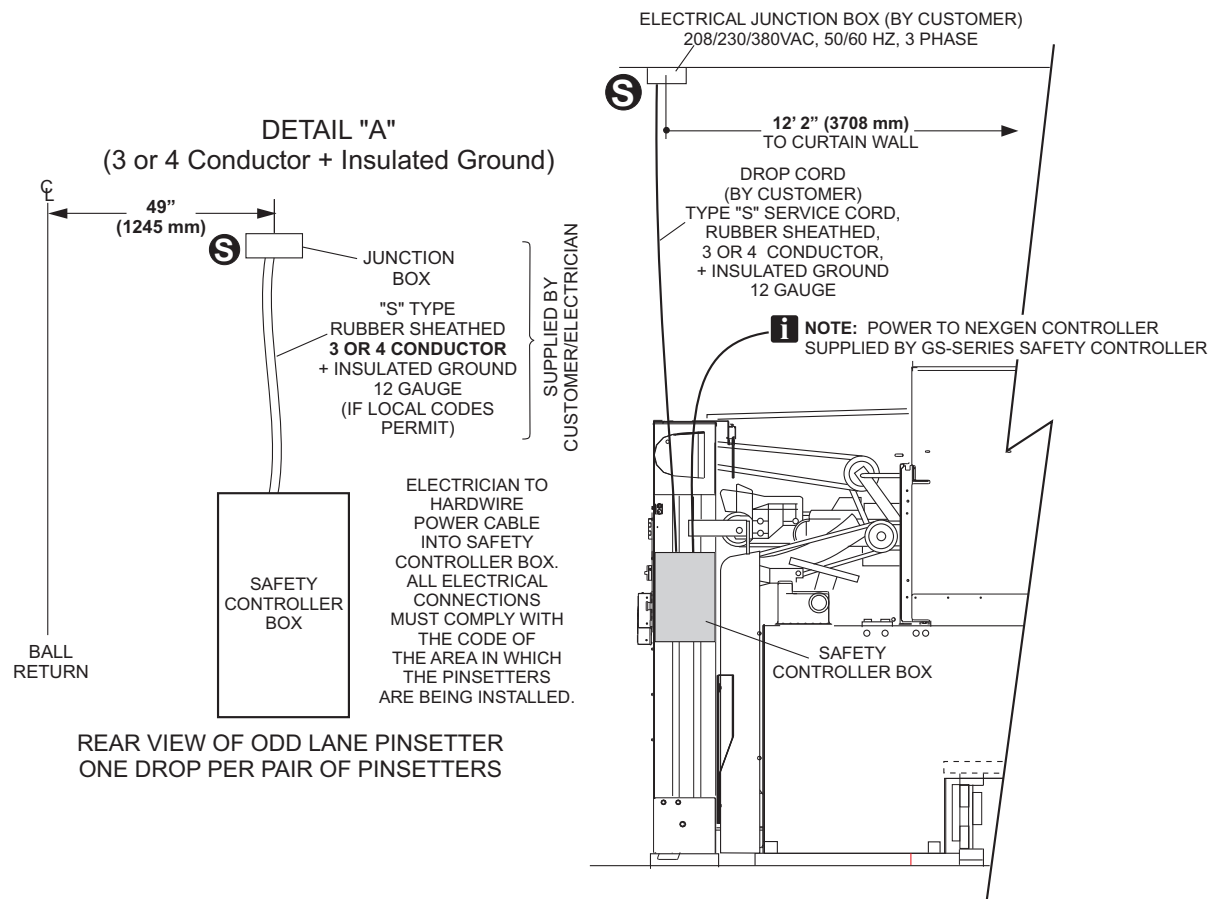
## Advanced Guarding with Safety Controller - Curtain Wall / Masking Unit

POWER REQUIREMENTS - GS SERIES SAFETY CONTROLLER								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
REFER TO FIGURES 5-8	50/60	AC	3	12	-	3 OR 4 WIRE + INSULATED GROUND	TO SUPPLY FEEDER WIRING, "J" BOX, FLEXIBLE DROP CORD AND MATING PLUGS.	-

CIRCUIT REQUIREMENTS - GS-SERIES SAFETY CONTROLLER					
GS-SERIES SUBPANEL	WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
YES	3/4	1 PER LANE PAIR	12 GAUGE	15 A	YES

**OUTLET LOCATION - GS-SERIES SAFETY CONTROLLER**  
 ONE JUNCTION BOX ABOVE ODD LANE ELEVATOR PER PAIR OF GS PINSETTERS.

## WITH CURTAIN WALL / MASKING UNIT



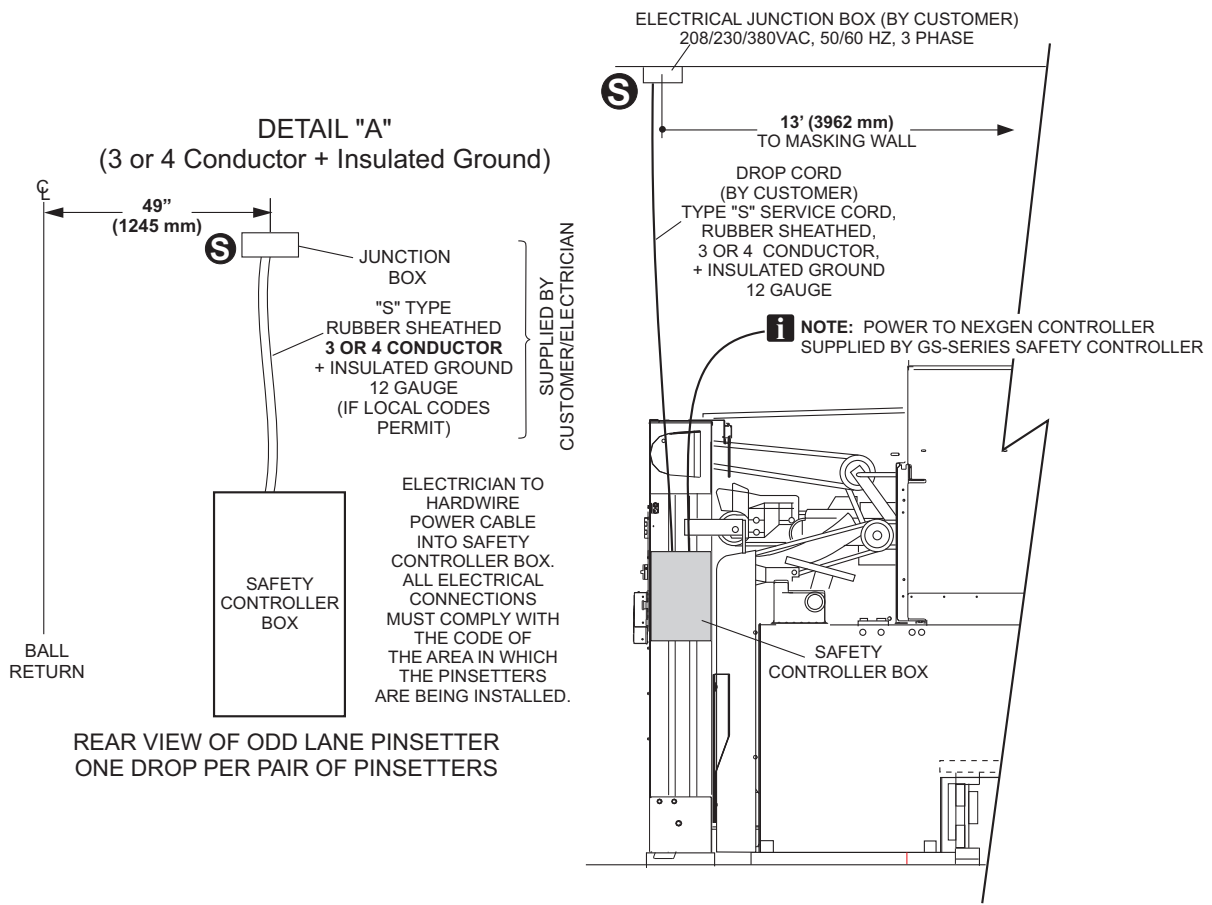
## Advanced Guarding with Safety Controller - Masking Wall

POWER REQUIREMENTS - GS SERIES SAFETY CONTROLLER								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
REFER TO FIGURES 5-8	50/60	AC	3	12	-	3 OR 4 WIRE + INSULATED GROUND	TO SUPPLY FEEDER WIRING, "J" BOX, FLEXIBLE DROP CORD AND MATING PLUGS.	-

CIRCUIT REQUIREMENTS - GS-SERIES SAFETY CONTROLLER					
GS-SERIES SUBPANEL	WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
YES	3/4	1 PER LANE PAIR	12 GAUGE	15 A	YES

OUTLET LOCATION - GS-SERIES SAFETY CONTROLLER
ONE JUNCTION BOX ABOVE ODD LANE ELEVATOR PER PAIR OF GS PINSETTERS.

## WITH MASKING WALL

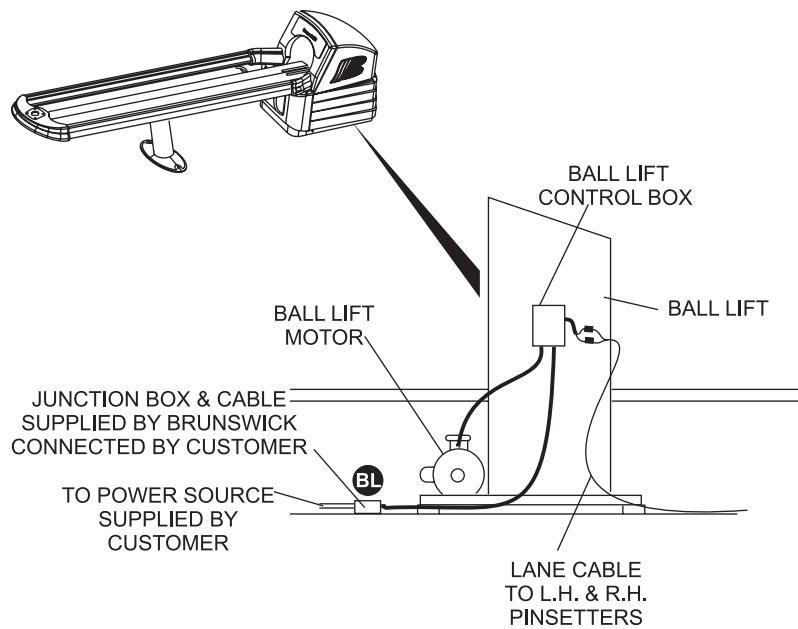


# BALL LIFT CONTROL BOX POWER OUTLET INFORMATION **BL**

POWER REQUIREMENTS - BALL LIFT CONTROL BOX								
VOLTS	HERTZ	AC/DC	PHASE	H.P. MOTOR	AMP	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
120 208 230	50/60	AC	1	1/4	6A @ 120 4A @ 208 OR 230	3 WIRE INSULATED WITH GROUND	TO SUPPLY FEEDER WIRING AND "J" BOX, CUSTOMER/ELECTRICIAN CONNECT	SUPPLY FLEXIBLE POWER WIRING WITH MALE PLUG, JUNCTION BOX & CABLE

CIRCUIT REQUIREMENTS - BALL LIFT CONTROL BOX				
WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
3	2	12 GAUGE	20A 120V/ 16A 230V	NO

**OUTLET LOCATION - GS - BALL LIFT CONTROL BOX**  
 ONE JUNCTION BOX UNDER THE APPROACH AT EACH BALL RETURN.



# TEL-E-FOUL POWER OUTLET INFORMATION T

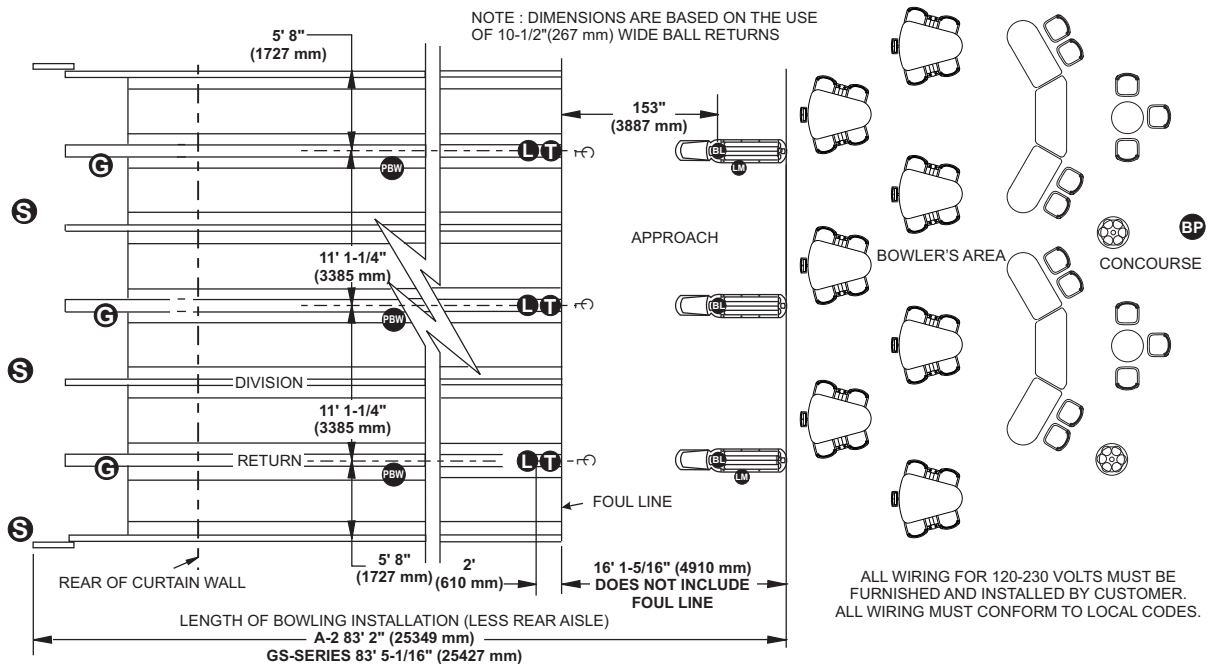
POWER REQUIREMENTS - TEL-E-FOUL								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
120 /230	50/60	AC	1	1	1@120 0.5@230	3 WIRE INSULATED WITH GROUND	TO SUPPLY FEEDER WIRING AND "J" BOX AND LOW VOLTAGE CONTROL CUSTOMER/ ELECTRICIAN CONNECT	TO SUPPLY AND INSTALL TEL-E-FOUL AND POWER CABLE TO "J" BOX.

CIRCUIT REQUIREMENTS - TEL-E-FOUL				
WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
3	14	12 GAUGE	20 A	YES
3	20	12 GAUGE	16A	YES

**OUTLET LOCATION - GS - BALL LIFT CONTROL BOX**

ONE JUNCTION BOX BELOW THE TEL-E-FOUL UNITS ON EACH RETURN NEAR THE FOUL LINE.

**NOTE:** TEL-E-FOULS SWITCHED BY 2 LANES AT CONTROL DESK (SUPPLIED AND INSTALLED BY CUSTOMER).



# LANE MACHINE POWER OUTLET INFORMATION LM

## POWER REQUIREMENTS - LANE MACHINE

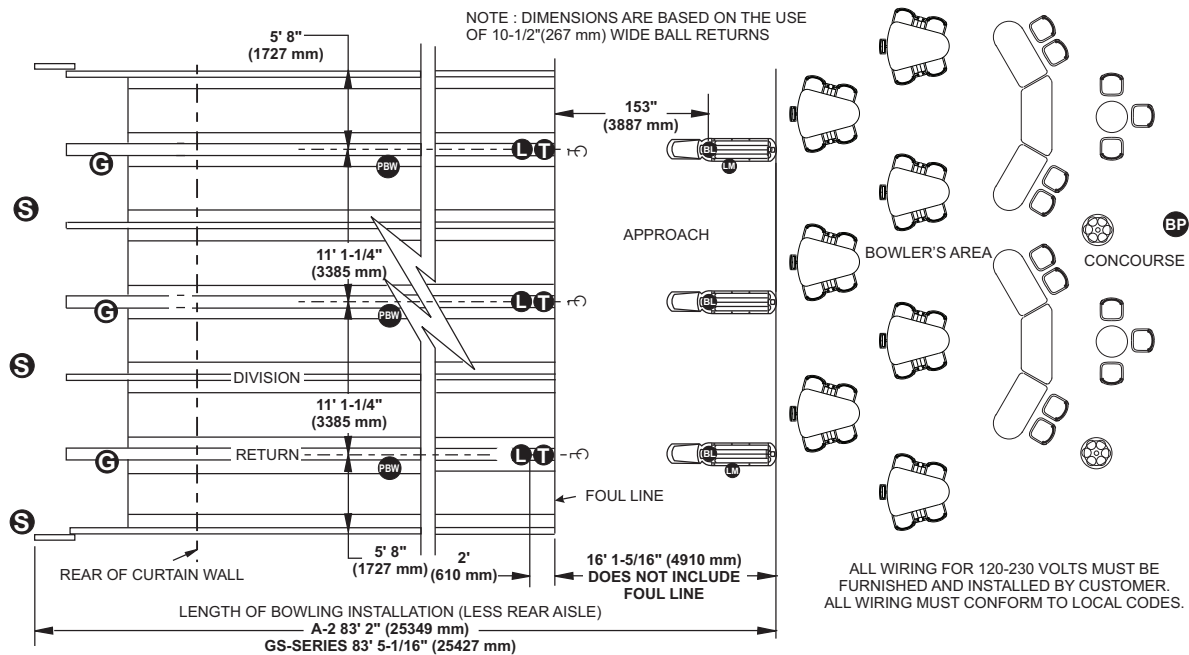
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
120 /230	50/60	AC	1	15 @ 120 10@230	1080	3 WIRE INSULATED WITH GROUND	TO SUPPLY FEEDER WIRING AND "J" BOX AND 3-PRONG GROUNDED OUTLET.	NONE

## CIRCUIT REQUIREMENTS - LANE MACHINE

VOLTAGE	WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
120	3	1	12 GAUGE	20 A	YES
230	3	1	12 GAUGE	15 A	YES

## OUTLET LOCATION - LANE MACHINE

ONE JUNCTION BOX AT EVERY OTHER BALL RETURN INSIDE THE BALL RETURN TRAP DOOR.



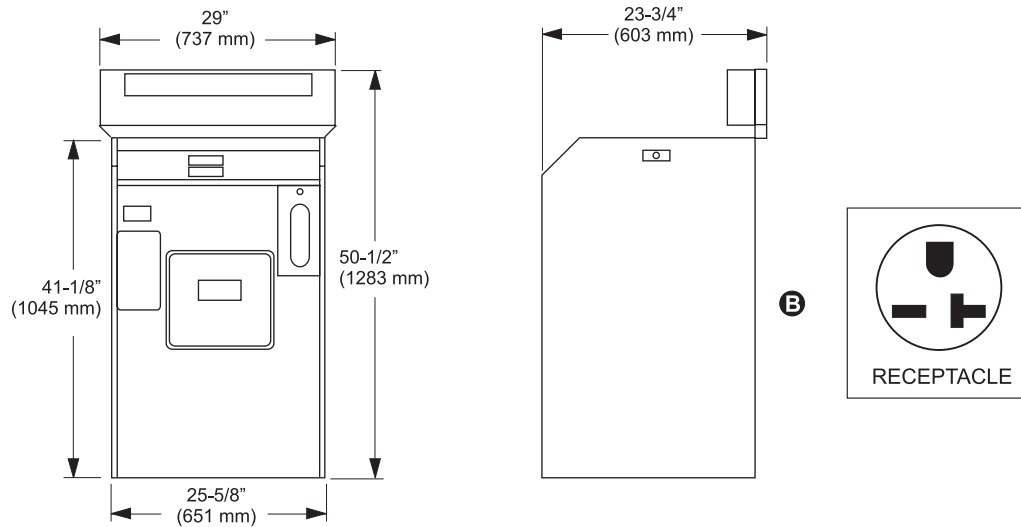


# BALL POLISHER POWER OUTLET INFORMATION

POWER REQUIREMENTS - LANE MACHINE								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
120 /230	50/60	AC	1	30 MAX ON DEMAND	1500 TO 2000	20 AMP, 3 WIRE, GROUNDED OUTLET	TO SUPPLY AN INSTALL OUTLET AT DESIRED LOCATION IN CONCOURSE AREA.	NONE

CIRCUIT REQUIREMENTS - LANE MACHINE				
WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
3	-	10 GAUGE	30 A	YES

OUTLET LOCATION - LANE MACHINE
ONE JUNCTION BOX AT DESIRED CONCOURSE LOCATION.

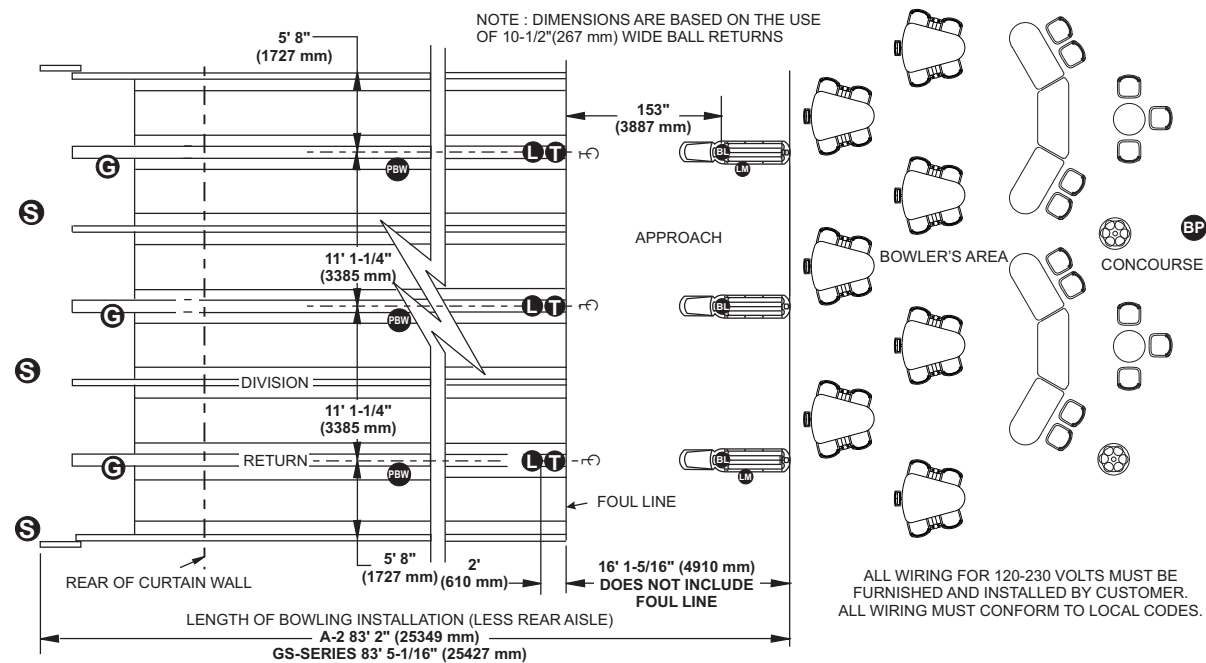


# LIGHTWORX POWER OUTLET INFORMATION **L**

POWER REQUIREMENTS - LIGHTWORX								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
120 /230	50/60	AC	1	1@120 .05@230	120	3 WIRE INSULATED GROUND WITH RECEPTACLE	TO SUPPLY FEEDER WIRING AND "J" BOX AND LOW VOLTAGE CONTROL CUSTOMER/ELECTRICIAN TO CONNECT.	TO SUPPLY POWER CABLE TO "J" BOX

CIRCUIT REQUIREMENTS - LIGHTWORX				
WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
3	14	12 GAUGE	20 A	YES
3	20	12 GAUGE	16A	YES

**OUTLET LOCATION - LIGHTWORX**  
 ONE JUNCTION BOX BELOW THE TEL-E-FOUL UNITS ON EACH RETURN NEAR THE FOUL LINE.



# PINBALL WIZARD POWER OUTLET INFORMATION

POWER REQUIREMENTS - PINBALL WIZARD								
VOLTS	HERTZ	AC/DC	PHASE	AMP	WATTS	CIRCUIT REQUIREMENT	CUSTOMER RESPONSIBILITY	BRUNSWICK RESPONSIBILITY
120 /230	50/60	AC	1	3 @120V 2 @ 230 V PER LANE PAIR	-	2 WIRE + INSULATED GROUND WITH I.G. 5262 HUBBELL RECEPTACLE OR EQUIVALENT	TO SUPPLY FEEDER WIRING AND "J" BOX WITH 120-230 VOLT I.G. 5262 HUBBELL RECEPTACLE OR EQUIVALENT	TO SUPPLY AND INSTALL PINBALL WIZARD AND POWER CABLE TO "J" BOX

CIRCUIT REQUIREMENTS - PINBALL WIZARD				
WIRES PER CIRCUIT	UNITS PER CIRCUIT	WIRE SIZE	BREAKER SIZE	RECEPTACLE PROVIDED BY CUSTOMER
3	LANE PAIR	12 GAUGE	20 A	YES
3	LANE PAIR	12 GAUGE	16 A	YES

**OUTLET LOCATION - PINBALL WIZARD**  
 ONE JUNCTION BOX BELOW GUTTER , NEAR EACH RETURN 27' (± 6') FROM FOUL LINE.

